

## Changes in bacterial activity and community composition in response to water mass mixing

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### ABSTRACT

Mixing zones and boundaries between different water masses are “hot spots” of marine biodiversity and activity. We aimed to investigate the effects of water mass mixing in the dark-ocean microbial communities by collecting and incubating natural bacterial communities from the Mediterranean Water (MW; at 1000 m depth), the Subpolar Modal Water (SPMW, 500m) and the Labrador Sea Water (LSW, 1800 m), and comparing them with artificially mixed communities. Mixing experiment 1 consisted of incubating at in situ conditions the original LSW and MW communities, plus a mixture of both (MIX1, dilution 1:1), whereas the Mixing experiment 2 included the original prokaryotic communities from SPMW and MW and a mixture of both (MIX2, dilution 1:1). Bacterial abundance and activity was monitored every 24h over 8 days, while bacterial community composition and DOM characterization were assessed at the beginning (day 0), middle (day 4) and at the end of the experiment (day 8). Live prokaryotic cell abundance was higher in the MIX1 and MIX2 treatments as compared to the original communities. Moreover, MIX1 bacteria showed slightly higher leucine incorporation rates than MW or LSW. These metabolic responses were accompanied by changes in the optical properties of DOM, suggesting a change in the dynamics of the organic matter. Taken together, our results indicate differences in the bio-reactivity of the organic matter after mixing as compared to the original water masses that could influence the composition and activity of the bacterial community.

**Keywords:** dark-ocean, bacterial activity, bacterial diversity, water mass mixing, dissolved organic matter.

***Section: 1) Microbes in future aquatic environments (Response of aquatic microbial communities to environmental changes)***

***Type of presentation: Oral***